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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WANG, TED M	
ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/807,131	HUTTUNEN, MIKKO	
	Examiner	Art Unit	
	Ted M. Wang	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 February 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-8,10-13 and 15* is/are rejected.

7)☒ Claim(s) *4,9 and 14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 August 2004* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed on 02/15/2005, have been fully considered but they are not persuasive. The Examiner has thoroughly reviewed Applicants' arguments but firmly believes that the cited reference to reasonably and properly meet the claimed limitations.

Independent Claims 1, 6, and 11

(1) *Applicants' argument* – "Applicant traverses the rejections because the cited prior art fails to disclose, teach or suggest all the features recited in the rejected claims. For example, the cited prior art fails to teach or suggest the claimed method for selecting a modulation detector in a receiver which includes at least a first and a second detector, the method comprising "determining at least one cross-correlation value between a stored training sequence and at least one training sequence of a received signal", and "selecting a detector used for detection of a signal to be received on the basis of the determined at least one cross-correlation value," as recited in independent claim 1 and its dependent claims."

Examiner's response – In response to applicant's argument as described in the above paragraph, the Lindoff et al. Patent discloses a simultaneous synchronization and modulation type detection apparatus (Fig.1A –1D). The specific detection of the modulation type and synchronization position process is described in column 3 and 4, and Fig.2A-2D). It based on the detection of the largest energy k-lag cross-corrlation

energy (value) between the different training sequences for each of M possible modulation types used in the particular communication system, TS_1 .. TS_M to determine (select) the correct modulation type and synchronization position (column 3 lines 3-62 and equations 1-4). It is inherent that after receiving the calculated cross-correlation energy (equation 2), the process selects and detects the modulation type individually. Thus, for the explanation addressed in the above paragraph, the rejection under 35 U.S.C. 103(a) with Lindofs' reference is adequate.

Following figures are used to show the equivalent function of the Fig.1 element 110 operation described in column 3 lines 3-62 and equations 1-4.

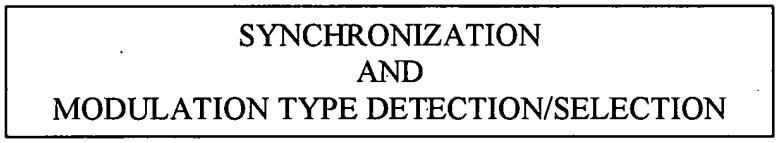


Fig.1 element 110

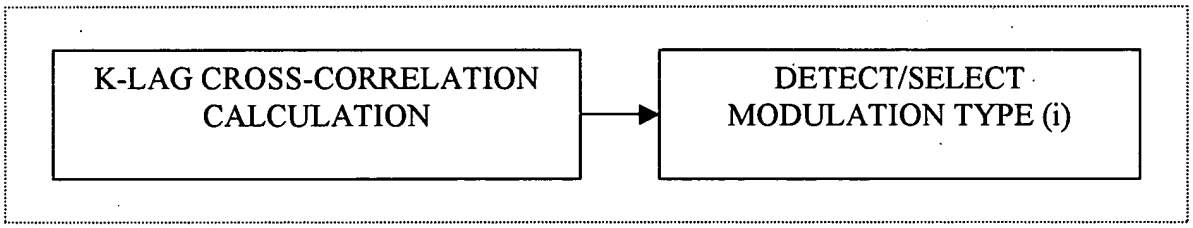
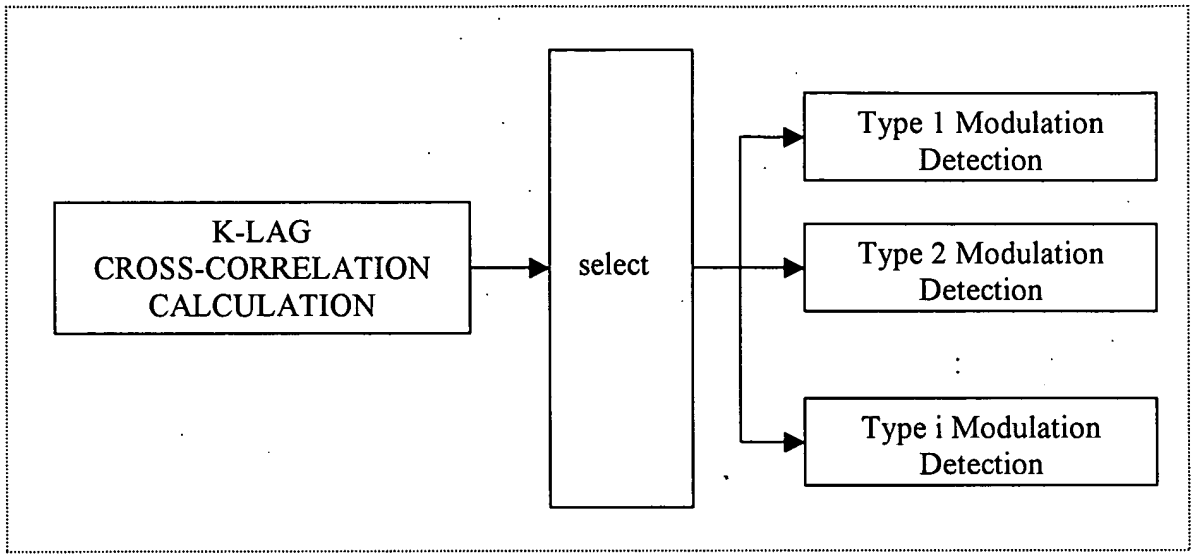


Fig.1 element 110



Equivalent Fig.1 element 110

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 6, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff et al. (US 6,463,107) in view of Koch (US 5,199,047).

- With regard claim 1, Lindoff et al. discloses a method for selecting a modulation detector or type in a receiver which includes at least a first and a second detector

(Fig.2A element 210, Fig.2B element 212, Fig.2C and 2D step 218, and column 3 lines 13-61), the method comprising: selecting a detector used for detection of a signal to be received on the basis of the determined at least one cross-correlation value (Fig.1A and column 3 lines 13 - 62).

Lindoff et al. discloses all of the subject matter as described above except for specifically teaching determining at least one cross-correlation value between a stored training sequence and at least one training sequence of a received signal as claimed.

However, Koch teaches a frame estimation method for determining at least one cross-correlation value between a stored training sequence and at least one training sequence of a received signal (Fig.1 elements 24, 26-28, Fig.3 elements 25-28, 32-35, column 4 line 47 – column 5 line 24, and column 7 line 59 – column 8 line 27).

It is desirable for determining at least one cross-correlation value between a stored training sequence and at least one training sequence of a received signal. One approach to achieve the desired advantage can be implemented by adopting Koch 's teaching, namely using the signal processor to determines the channel impulse response in a known manner by means of cross-correlation of the sample value Z stored in the RAM with the training data sequence X stored in the ROM so as to save on modulation circuitry (column 6 line 63 –column 7 line 5). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to replace Lindoffs' correlation method with the

method as taught by Koch, in which determining at least one cross-correlation value between a stored training sequence and at least one training sequence of a received signal, so as to simplify or reduce the modulation circuit.

- With regard claim 6, which is a receiver means function claim related to claim 1, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 11, which is a receiver claim related to claim 1, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.

4. Claims 2, 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff et al. (US 6,463,107) and Koch (US 5,199,047) as applied to claim 1 above, and further in view of Kubo (US 5,140,617).

- With regard claim 2, Lindoff et al. and Koch disclose all of the subject matter as described above except for specifically teaching searching for an ideal synchronization point of the received signal, at which point the cross-correlation between the training sequence of the received signal and the stored training sequence has a maximum value; and calculating the cross-correlation value between the stored training sequence and the training sequence of the received signal, which is obtained by shifting a synchronization point of the received signal for one symbol sequence at least one of forwards or backwards from the ideal synchronization point as claimed.

However, Kubo teaches that searching for an ideal synchronization point of the received signal, at which point the cross-correlation between the training sequence of the received signal and the stored training sequence has a maximum value (Fig.1 and column 1 line 53 – column 2 line 27, Fig.4 and column 4 line 54 – column 5 line 19); and calculating the cross-correlation value between the stored training sequence and the training sequence of the received signal, which is obtained by shifting a synchronization point of the received signal for one symbol sequence at least one of forwards or backwards from the ideal synchronization point (Fig.1 and column 1 line 53 – column 2 line 6).

It is desirable to implement a method as described above. One approach to achieve the desired advantage can be implemented by adopting Kubo 's teaching, namely a frame synchronization transmission is carried out at the beginning of communication wherein a known transmitted symbol sequence x(n), n=0, 1, . . . , N-1 is transmitted, and a cross-correlation between the received symbol sequence and the known symbol sequence x(n) is calculated for a predetermined number M of combinations of values; the received signal is successively delayed by an amount equal to a sample period of the signal, cross-correlation values for each delayed signal with respect to a known transmission pattern are calculated, and a predetermined number of cross-correlation values of subsequent phases are added to the cross-correlation value of each initial phase; the true initial phase of the signal is estimated to be the initial phase corresponding to the maximum sum of cross-correlation values in order to

improve the interference between signals caused by multipath propagation or noise (column 4 lines 16-25). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Kubo into Lindoff et al. and Kochs' cross-correlation process for determining at least one cross-correlation value so as to improve the interference between signals caused by multipath propagation or noise.

- With regard claim 7, which is a receiver means function claim related to claim 1, all limitation is contained in claim 2. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 12, which is a receiver claim related to claim 1, all limitation is contained in claim 2. The explanation of all the limitation is already addressed in the above paragraph.

5. Claims 3, 5, 8, 10, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lindoff et al. (US 6,463,107) and Koch (US 5,199,047) as applied to claim 1 above, and further in view of Yamaguchi et al. (US 5,533,066).

- With regard claim 3, Lindoff et al. and Koch disclose all of the subject matter as described above except for specifically teaching that the received signal is a complex signal, whereby at least one cross-correlation value to be determined is a complex cross-correlation value.

  However, Yamaguchi et al. teaches that the received signal is a complex signal, whereby at least one cross-correlation value to be determined is a complex

cross-correlation value (Fig.14(b) and Fig.15 and column 13 line 23 – column 14 line 17).

It is desirable that the received signal is a complex signal, whereby at least one cross-correlation value to be determined is a complex cross-correlation value. a sampling phase calculating part calculates a complex cross-correlation function; of a part corresponding to a training sequence of an equalizer of each sequence with respect to individual sample value sequences i of a reception signal y(t) which are sampled in a plurality of different sampling phases and selects a sampling phase where the absolute value of the complex cross-correlation functions is maximized, then selects a sampling phase where the bit error rate is minimized according to a calculation based on the above selected sampling phase (Abstract). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the method as taught by Yamaguchi et al. in which, the received signal is a complex signal, whereby at least one cross-correlation value to be determined is a complex cross-correlation value, into Lindoff et al. and Kochs' cross-correlation process so as to improve the bit error rate.

- With claim 5, Lindoff et al. and Koch and Yamaguchi et al. disclose all of the subject matter as described above except for specifically teaching that the first detector includes a channel equalizer.

However, Koch further discloses that the first detector includes a Viterbi equalizer that simultaneously provides decoding and channel equalizer (Fig.1 and 3 element 25 and column 4 lines 21-46, and column 7 lines 59-66).

It is desirable that the first detector includes a channel equalizer so that the distortion of the original transmitted symbols can be improved (column 1 lines 28-33). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made include a channel equalizer as taught by Koch, in which the first detector including a channel equalizer, so as to eliminate the distortion of the original transmitted symbols.

- With regard claim 8, which is a receiver means function claim related to claim 1, all limitation is contained in claim 3. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 10, which is a receiver claim related to claim 1, all limitation is contained in claim 5. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 13, which is a receiver means function claim related to claim 3, all limitation is contained in claim 3. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 15, which is a receiver claim related to claim 1, all limitation is contained in claim 5. The explanation of all the limitation is already addressed in the above paragraph.

Allowable Subject Matter

6. Claims 4, 9, and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

8. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 571-272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M Wang
Examiner
Art Unit 2634

Ted M. Wang

SHUWANG LIU
PRIMARY EXAMINER